

### **REMARKS**

Claims 1-41 remain pending in this application. Claims 1, 8, 15, and 22 are independent. Claims 1, 8, 15, and 22 have been amended. No new matter is involved with any claim amendment, and no new issues are believed to be raised in the present amendment since Applicants' previously submitted amendment and remarks addressed the substance of the claim amendments.

### **Anticipation Rejection By Cotteverte et al.**

Withdrawal of the rejection of claims 1-28 under 35 U.S.C. §102(e) as being anticipated by Cotteverte et al. (U.S.P. No. 6,542,682 B2) is requested.

Applicant notes that anticipation requires the disclosure, in a prior art reference, of each and every limitation as set forth in the claims.<sup>1</sup> There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. §102.<sup>2</sup> To properly anticipate a claim, the reference must teach every element of the claim.<sup>3</sup> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference".<sup>4</sup> "The identical invention must be shown in as complete detail as is contained in the ...claim."<sup>5</sup> In determining anticipation, no claim limitation may be ignored.<sup>6</sup>

### ***Discussion of Cotteverte et al.***

Cotteverte et al. column 11, line 16 discloses the use of a piezoelectric substrate, which makes sense since they are relying on mechanical displacement to attain switching. In contrast, Applicants use silicon as the material, and which is a non-piezoelectric material, since

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<sup>1</sup> *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).

<sup>2</sup> *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 USPQ2d 1001 (Fed. Cir. 1991).

<sup>3</sup> See MPEP § 2131.

<sup>4</sup> *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

<sup>5</sup> *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

<sup>6</sup> *Pac-Tex, Inc. v. Amerace Corp.*, 14 USPQ2d 187 (Fed. Cir. 1990).

Applicants rely upon the electro-optic effect to attain switching, e.g., by generation of electron-hole pairs. Applicants' approach does not involve any moving or mechanical parts to achieve switching as opposed to Cotterverte's piezoelectric approach.

***Specific Deficiencies of the Applied Art***

Cotterverte et al. do not disclose an electro-optical switch that includes, among other features, "a non-piezoelectric photonic crystal having first and second waveguides...wherein...a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides", as recited in independent claim 1, as amended.

Further, the applied art does not disclose a photonic bandgap integrated circuit that includes, among other features, "a non-piezoelectric photonic crystal...wherein a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides", as recited in independent claim 8, as amended.

In addition, the applied art does not disclose a coupled photonic crystal waveguided system that includes, among other features, "first and second photonic bandgap waveguides provided adjacent to each other along a non-piezoelectric coupling length, wherein a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides", as recited in independent claim 15, as amended.

Finally, the applied art does not disclose a method for providing an electro-optical switch that includes, among other features, "providing a non-piezoelectric photonic crystal...wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length", as recited in independent claim 22, as amended.

Consideration and allowance of claims 1-41 are respectfully requested.

**Anticipation Rejection By Allan et al.**

Withdrawal of the rejection of claims 1, 8, 15, 22, 31, 34, 37, 40, and 41 under 35 U.S.C. §102(e) as being anticipated by Allan et al. (US 2002/0021878 A1) is requested.

The legal requirements for anticipation are set forth above.

***Discussion of Allen et al.***

Allen specifically discloses (e.g., see the Abstract) that “the propagation of the optical signal in the defect waveguide is controlled by varying the optical properties at least one of the upper clad region and lower clad region”. These regions are referred to as “the controllable regions”. Allen et al. changes the evanescent tail of the optical modes extending in the lower and or upper clad regions. In contrast, Applicants change the optical properties of the actual defect waveguide region itself by an electro-optic effect, for example.

***Specific Deficiencies of the Applied Art***

Allen et al. do not disclose an electro-optical switch that includes, among other features, “a non-piezoelectric photonic crystal having first and second waveguides...wherein...a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides”, as recited in independent claim 1, as amended.

Further, the applied art does not disclose a photonic bandgap integrated circuit that includes, among other features, “a non-piezoelectric photonic crystal...wherein a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides”, as recited in independent claim 8, as amended.

In addition, the applied art does not disclose a coupled photonic crystal waveguided system that includes, among other features, “first and second photonic bandgap waveguides provided adjacent to each other along a non-piezoelectric coupling length, wherein a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides”, as recited in independent claim 15, as amended.

Finally, the applied art does not disclose a method for providing an electro-optical switch that includes, among other features, “providing a non-piezoelectric photonic crystal...wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length”, as recited in independent claim 22, as amended.

Reconsideration and allowance of claims 1-41 are respectfully requested.

**Unpatentability Rejection over Allan et al.**

Withdrawal of the rejection of claims 29, 30, 32, 33, 35, 36, 38, and 39 under 35 U.S.C. §103(a) as being unpatentable over Allen et al. is requested.

At the outset, Applicant notes that, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations.<sup>7</sup> Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.<sup>8</sup>

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<sup>7</sup> See MPEP §2143.

<sup>8</sup> *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and See MPEP §2143.

An essential evidentiary component of an obviousness rejection is a teaching or suggestion or motivation to combine the prior art references.<sup>9</sup> Combining prior art references without evidence of a suggestion, teaching or motivation simply takes the inventors' disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.<sup>10</sup>

“There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.”<sup>11</sup> Further with regard to the level of skill of practitioners in the art, there is nothing in the statutes or the case law which makes “that which is within the capabilities of one skilled in the art” synonymous with obviousness.<sup>12</sup> The level of skill in the art cannot be relied upon to provide the suggestion to combine references.<sup>13</sup>

As admitted by the Examiner, Allen et al. fail to explicitly teach that the change in conductance is induced by electrical carrier injection or optically induced by electron-hole pair generation. To make up for this deficiency, the Examiner improperly relies upon Official Notice as teaching this feature, and asserts that Applicants' claimed invention is obvious in light of this Official Notice.

While electrical carrier injection or optically induced electron-hole pair generation may be generally known, Applicants ***do not*** admit that such techniques have been or are known to be used as disclosed and claimed by Applicants. The Examiner merely asserts that changing the conductance along the coupling length by such techniques would have been obvious in light of Allen et al., given the knowledge of a person of ordinary skill in the art.

Specifically, as discussed above, Applicants submit that it was not within the skill of the art at the time of Applicants' claimed invention to inject electrical carriers or optically induce electron-hole pair generation to accomplish the purposes of Applicants' claimed invention.

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<sup>9</sup> *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 USPQ2d 1225 (Fed. Cir. 1998)

<sup>10</sup> *Interconnect Planning Corp. v. Feil*, 227 USPQ 543 (Fed. Cir. 1985)

<sup>11</sup> See MPEP §2143.01, citing *In re Rouffet*, 149 F.3d, 1350, 1357, 47 USPQ2d 1453, 1457-8 (Fed. Cir. 1998).

Accordingly, Applicants respectfully request that the Examiner provide a properly combinable reference showing this teaching with the next Office Action. If the Examiner's assertions regarding the unpatentability rejections are correct, finding a properly combinable reference should impose no great burden on the Examiner. Failure to provide such a teaching should result in removal of this rejection.

Accordingly, withdrawal of the rejection and allowance of claims 29, 30, 32, 33, 35, 36, 38, and 39 are respectfully requested.

### **Conclusion**

In view of the above amendment and remarks, Applicants believe that each of pending claims 1-41 in this application is in immediate condition for allowance. An early indication of the same would be appreciated.

In the event the Examiner believes an interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number indicated below.

The Examiner is respectfully requested to enter this Amendment After Final, in that it raises no new issues, but merely places the claims in a form more clearly patentable over the references of record. In the alternative, the Examiner is respectfully requested to enter this Amendment After Final in that it reduces the issues for appeal.

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<sup>12</sup> *Ex parte Gerlach and Woerner*, 212 USPQ 471 (PTO Bd. App. 1980).

<sup>13</sup> *See* MPEP §2143.01, citing *Al-Site Corp. v. VSI Int'l Inc.*, 50 USPQ2d 1161 (Fed. Cir. 1999).

Applicants believe no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 00131-00288-US2 from which the undersigned is authorized to draw.

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Respectfully submitted,

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